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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Contents; Some Basic Concepts; Introduction; Probability Distributions, Stationarity & Ensemble Statistics; Essentials of Probability Distributions; Ensembles, Expectations etc; The Ergodic Hypothesis; The Chebychev Inequality; Time Averages and Ergodidty; Properties of Estimators; Bias of an Estimator; An Example; Variance of an Estimator; An Example; Mean Square Error of an Estimator; Orthogonality; Orthogonal Functions and Vectors; Orthogonal Vector Space; Gram-Schmidt Orthogonalization; Remarks; Orthogonality and Correlation; Orthogonality and Eigenvectors; Fourier Analysis IntroductionOrthogonal Functions; Fourier Series; The Fourier Transform; Properties of the Fourier Transform; The FT of Some Functions; Truncation in Time; Symmetries; Living in a Discrete World; Aliasing and the Poisson Sum Formula; Some Theoretical Details; Limits of Infinite Scries; Remarks; The z Transform; Relationship Between z and Fourier Transforms; Discrete Fourier Transform; Inverse DFT; Zero Padding; The Fast Fourier Transform (FFT); Linearity and Time Invariance; Causal Systems; Discrete Convolution; Convolution and the z Transform; Dcconvolution; Dipole Filters Invertibility of Dipole FiltersProperties of Polynomial Filters; Some Toy

Examples for Clarity; Least Squares Inversion of Minimum Phase Dipoles; Inversion of Minimum Phase Sequences; Inversion of Nonminimum Phase Wavelets: Optimum Lag SpikingFilters; Discrete Convolution and Circulant Matrices; Discrete and Circular Convolution; Matrix Notation for Circular Convolution; Diagonalization of the Circulant Matrix; Applications of the Circulant; Convolution; Deconvolution; Efficient Computation of Large Problems; Polynomial and FT Wavelet Inversion; Expectations etc.,; The Covariance Matrix Lagrange MultipliersLinear Time Series Modelling; Introduction; The Wold Decomposition Theorem; The Moving Average. MA, Model; Determining the Coefficients of the MA Model; Computing the Minimum Phase Wavelet via the FFT; The Autoregressive, AR, Model; Autocovariance of the AR Process; Estimating the AR Parameters; The Levinson Recursion; Initialization; The Prediction Error Operator, PEO; Phase Properties of the PEO; Proof of the Minimum Delay Property of the PEO; The Autoregressive Moving Average, ARMA, Model; A Very Special ARMA Process
MA, AR and ARMA Models in Seismic Modelling and ProcessingExtended AR Models and Applications; A Little Predictive Deconvolution Theory; The Output of Predictive Deconvolution; Remarks; Summary; A Few Words About Nonlinear Time Series; The Principle of Embedding; Summary; Levinson's Recursion and Reflection Coefficients; Theoretical Summary; Summary and Remarks; Minimum Phase Property of the PEO; PROOF I; Eigenvectors of Doubly Symmetric Matrices; Spectral decomposition; Minimum phase property; PROOF II; Discussion; Information Theory and Relevant Issues; Introduction Entropy in Time Series Analysis

Sommario/riassunto

This book examines different classical and modern aspects of geophysical data processing and inversion with emphasis on the processing of seismic records in applied seismology. Chapter 1 introduces basic concepts including: probability theory (expectation operator and ensemble statistics), elementary principles of parameter estimation, Fourier and z-transform essentials, and issues of orthogonality. In Chapter 2, the linear treatment of time series is provided. Particular attention is paid to Wold decomposition theorem and time series models (AR, MA, and ARMA) and their connection t